Aberjona River Study
Ecological Risk Assessment

Industri-Plex and Wells G & H Superfund Sites, Woburn, MA

June 2003

This is the second fact sheet for the Aberjona River Study focusing on EPA's investigation of contamination and the risk it presents to the environment along the river, its floodplain and wetlands. The first fact sheet, released in April 2003, focused on risks to human health. This fact sheet focuses on the risks to the environment.

The ecological risk assessment for the Aberjona River Study area focuses on sediments, surface water, soils, fish and other biological data (e.g. aquatic plants and sediment invertebrates) along six miles of the Aberjona River and wetlands from Route 128 in Woburn to the Mystic Lakes in Arlington and Medford. The study area is divided into six sections along the river, called reaches, which are illustrated on the attached map. Reach 1 contains the Wells G&H Superfund Site and associated 38-acre wetland, while Reach 2 contains a former cranberry bog. After the cranberry bog, the river continues to flow south as a well-defined river channel through Reaches 3, 4 and 5 prior to discharging into Reach 6, or the Mystic Lakes.

EPA analyzed over 390 sediment and soil samples from 52 sampling stations along the study area (see figure 1). Additional sediment samples were collected from twelve stations outside the study area to provide background information for comparison. Surface water, fish, aquatic plants and sediment-dwelling (benthic) invertebrates samples were also collected from inside and outside the study area. EPA also conducted various sediment toxicity tests to further evaluate potential impacts to the invertebrate communities living in the sediments.

Arsenic was present in sediments throughout the study area. Other metals, including antimony, chromium, copper, lead, mercury and zinc, were also detected at elevated levels. The Wells G&H 38-acre wetland exhibited some of the highest concentrations of metals within the study area.

EPA evaluated various ecological receptors, which may come in contact with contaminants while inhabiting the study area and exhibit adverse ecological effects. EPA evaluated the ability of organisms, representing key ecological receptors, to live, grow and reproduce in the study area. The ecological receptors selected for the ecological risk assessment represent various components of the food chain within the study area. They include:

- fish
- benthic invertebrate community
- muskrat
- mallard duck
- green heron
- short-tailed shrew

EPA's evaluation took into account each receptors' potential feeding habitat and range. For wildlife including mallard, green heron, shrew and muskrat, the concentration of contaminants in sediment, water and biota were used to estimate dietary exposures and were compared to reference values known to be toxic to each organism. For representative warm-water species, contaminant concentrations in the bodies of fish within the study area were compared to values at reference locations and to concentrations known

Additional Information

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Copies of the combined Human Health and Ecological Risk Assessment are available at the following locations:

Winchester Public Library
80 Washington Street
Winchester, MA

Woburn Public Library
45 Pleasant Street
Woburn, MA

the report can also be found on EPA's web site:
www.epa.gov/region01/superfund/sites/wellsgh/42364_TOC_Text.pdf

to show adverse effects on fish. Laboratory toxicity tests were used to evaluate potential effects of sediment contaminants on invertebrate populations.

The risk assessment did not reveal a risk to fish or green heron within the study area. However, risks were widely observed in depositional sediments in Reach 1 (Wells G&H 38-acre wetland) and the upper section of Reach 2 (17-acre former cranberry bog). In addition, two sediment stations in Reach 6 (Mystic Lakes) indicated potential risks to benthic invertebrates. The risks to these receptors were primarily due to exposure to metals contamination in sediments and/or vegetation growing in contaminated sediments. Figure 1 illustrates the stations (red dots) along the study area with potential ecological risks. Twenty of the 22 sediment stations which exceed acceptable levels of risk to environmental receptors within the study area are located in the Wells G&H 38-acre wetland and in the 17-acre former cranberry bog.

Figure 2 summarizes the ecological risks at each sediment station in Reaches 1 and 2. A small table includes the station number (e.g. WH), environmental receptors (e.g. B = benthic invertebrates) and contaminant color codes which are contributing to the risk (e.g. red = arsenic) for each sediment station. As illustrated on the figure, multiple environmental receptors and contaminants contribute to the increased risks at sediment stations in Reach 1 where 16 stations in the 38-acre wetland exceed the risk level and Reach 2 where 4 stations in the former cranberry bog exceed the risk level. Arsenic was the most frequent contaminant driving the ecological risks for one or more receptors at a station. It was responsible for increased risks at 18 of the 20 stations. Copper, chromium, mercury, and lead in sediments also contributed to increased risks for one or more stations and/or receptors.

The most significantly impacted areas along the study area are Reach 1 (Wells G&H 38-acre wetland) and the upper portion of Reach 2 (the former 17-acre cranberry bog). The ecological risks associated with the two stations in Reach 6 are considered minimal based upon limited number of receptors and stations potentially impacted, and the average arsenic concentrations only slightly exceeding a level anticipated to cause adverse effects on benthic invertebrates.

In summary, Figure 2 presents the stations in the study area where there are risks to one or more ecological receptors, including muskrat, benthic invertebrates, mallard ducks and shrew. The risks are most frequently associated with arsenic contamination. The greatest risks were found in Reach 1 and the upper portion of Reach 2.

The draft human health and ecological risk assessments are available for review at the Woburn and Winchester public libraries. In addition, a copy of the risk assessment is posted on EPA's web site at:

www.epa.gov/region01/superfund/sites/wellsgh/42364_TOC_Text.pdf

To Comment:

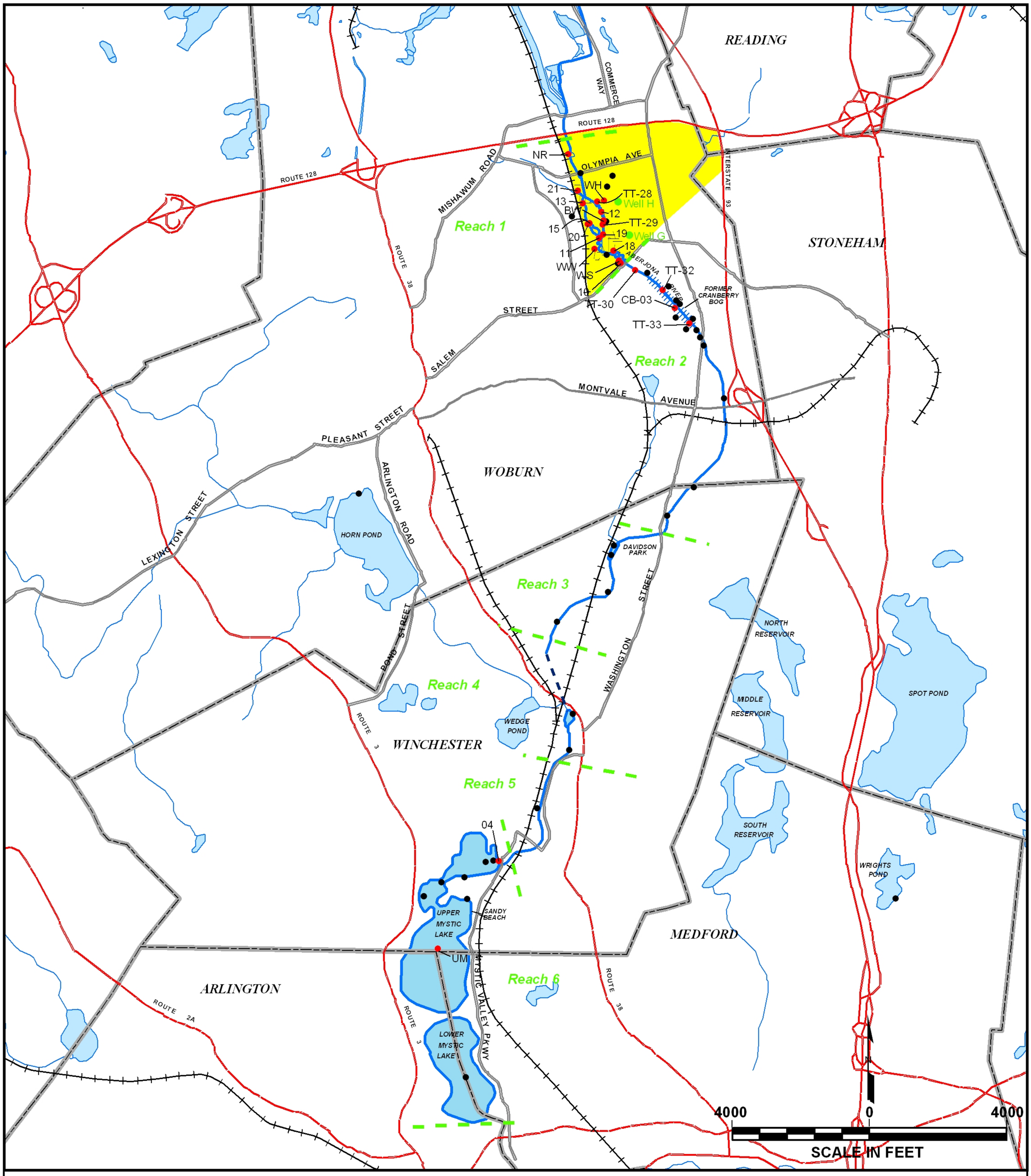
EPA has extended the due date for the Human Health Risk Assessment comments and set August 25, 2003 as the due date for all comments to the Human Health and Ecological Risk Assessments. Please send your comments to the following address:

Angela Bonarrigo
U.S. EPA
1 Congress St., Suite 1100 (HIO)
Boston MA 02114

or e-mail your comments or questions to:
bonarrigo.angela@epa.gov

Next Steps:

The draft human health and ecological risk assessments for the Aberjona River Study will be expanded to include environmental data collected immediately upstream of the study area (i.e., north of Route 128). A final risk assessment will be presented in a report called a Remedial Investigation. This comprehensive Remedial Investigation, which evaluates all data, the movement of contaminants within the environment, and any potential risks associated with these contaminants, is expected to be completed by Fall 2003. It will be used to formulate a comprehensive strategy to address human health and ecological risks from the Industri-Plex Superfund Site to the Mystic Lakes.



LEGEND

- Well Location
- Sample Station with Risk
- Sample Station
- Aberjona River
- Bodies of Water
- Rail Lines
- Study Area Reach
- Culvert
- Wetlands
- Former Cranberry Bog
- Wells G & H Superfund Site

FIGURE 1.

SAMPLING STATIONS WITH ECOLOGICAL RISK

WELLS G&H SUPERFUND SITE

ABERJONA RIVER (OPERABLE UNIT 3)

Metcalf & Eddy

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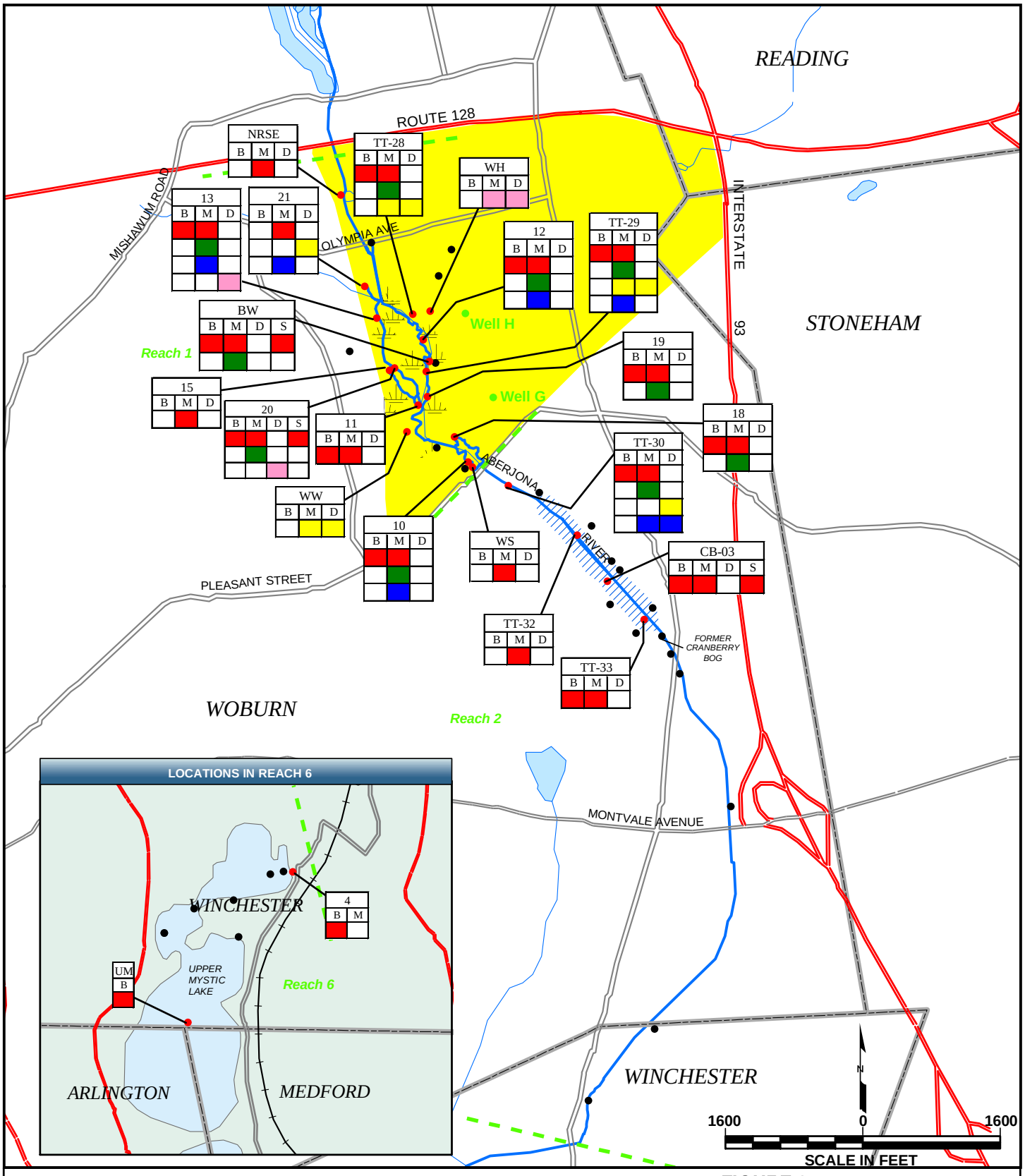

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Risk To:
B - Benthos
M - Muskrat
D - Mallard
S - Shrew

Risk From:
- Arsenic
- Copper
- Chromium
- Mercury
- Lead

FIGURE 2.

SUMMARY OF RECEPTOR RISKS

ECOLOGICAL RISK ASSESSMENT

WELLS G&H SUPERFUND SITE

ABERJONA RIVER (OPERABLE UNIT 3)

Metcalf & Eddy

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Send us Your Comments or Questions

If you have comments or questions regarding the Ecological Risk Assessment, please write them below and mail them to:

Angela Bonarrigo

U.S. EPA

1 Congress St., Suite 1100 (HIO)

Boston MA 02114

or e-mail your questions to: bonarrigo.angela@epa.gov